L 14990-66 EWT(1)/EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t)/EWP(b) IJP(c) JD/WW/JG/LHB
ACC NR: AP5028561 (N) SOURCE CODE: UR/0126/65/020/005/0719/0722

AUTHOR: Umanskiy, Ya. S.; Fadeyeva, V. I.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Diffuse scattering of x rays in HfC-ZrC solid solutions

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 5, 1965, 719-722

TOPIC TAGS: carbide phase, hafnium compound, zirconium containing alloy, metal physics, phase transition, metal hardening, crystal lattice formation, x ray scattering

ABSTRACT: Diffuse x-ray scattering was used to study short range order in solid solutions of HfC-ZrC having an atomic ratio of 50:50. The ordering reaction was followed in the metallic sublattice of the compound by taking one point on this lattice as the sphere of reflection and computing every coordination sphere filled by metal atoms. The alloy was made from HfC containing 6.20% combined carbon and 0.09% free carbon, and ZrC containing 11.48% combined and 0.16% free carbon. Samples were prepared by hot pressing at 1900°C, homogenizing at 2700°C for 2 hrs (Tamman fur-

UDC: 548.73 : 669.018.4

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nace--helium atmosphere) and heat treating isothermally at 2100°C (20 min), 1900°C (5 hrs) and 1200°C (100 hrs) with subsequent air cooling. The lattice parameter of the alloy was a = 4.664 angstroms. Diffuse scattering was measured on a URS-50I diffractometer according to the method generally used for polycrystals; a vacuum camera aided in eliminating air dispersion. Both Compton and thermal scattering were determined. The resultant diffuse scattering gave an indication of the short range order existing in the lattice. The short range order parameter α_i was obtained from the following equation:

$$I_{tot} = Nc_A c_B (f_B - f_A)^2 \left(1 + \sum_{i=1} c_i \alpha_i \frac{\sin kr_i}{kr_i}\right).$$

This parameter was utilized in getting the first two coordination spheres of the alloy quenched from 1900 and 1500°C; these values α_1 and α_2 rose somewhat with lowering in annealing temperature, while α_3 for the third coordination sphere was negative and very small in absolute magnitude. The significance of the sign and magnitude of α_1 was examined. The positive sign for the first two parameters indicated a segregation tendency among the metallic atoms, while the small magnitude of α_1 for the alloys quenched from 1500 and 1900°C signified a low value for the critical

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ACC NR: AP5028561

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decomposition temperature of the solid solution. X-ray intensity was plotted as a function of sin θ/λ for samples quenched from 1900, 1500 and 1200°C. The radial scattering density of the atoms was also given. A low value of the migration energy *U* based on the short range order observations was postulated as a function of temperature. A calculation showed this energy to be 1.5 kcal/g-atom for specimens annealed at 1900 and 1500°C. Microhardness was shown as a function of heat treatment temperature. This hardness dropped steadily with increase in temperature, indicating a loss in order. It was concluded that at temperatures close to the critical mark, mixtures of two solid solutions are present: HfC in ZrC and ZrC in HfC. Orig. art. has: 3 figures, 2 equations.

SUB CODE: 20,11/ SUBM DATE: 05Jan65/ ORIG REF: 004/ OTH REF: 003

Card 3/3

L 57812-65 EPF(n)-2/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) Pu-4
ACCESSION NR: AP5008798 IJP(c) JD/JG S/0126/65/019/003/0473/0475

32
31
B

AUTHOR: Umanskiy, Ya. S.; Fadeyeva, V. I.

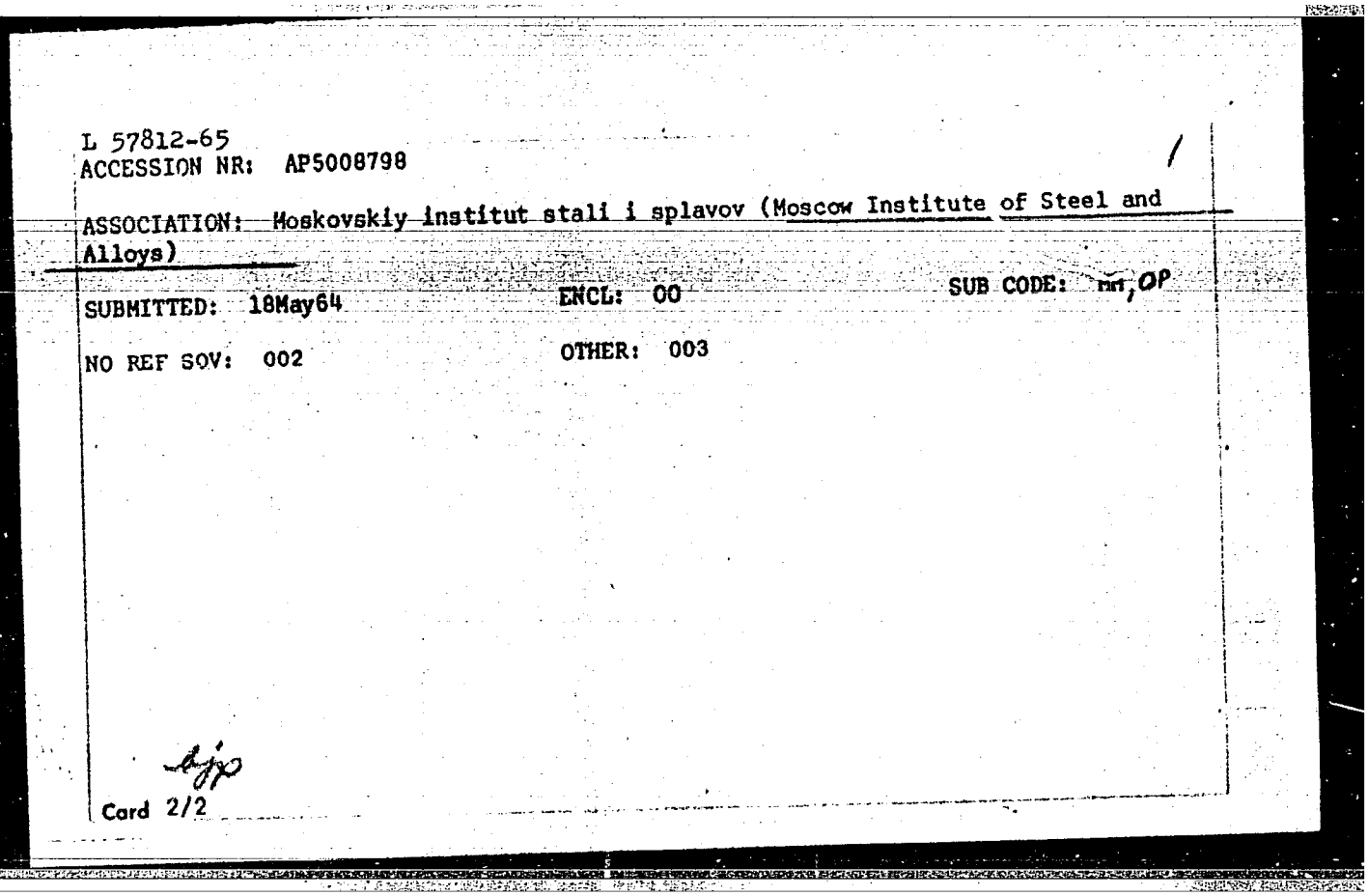
TITLE: Diffusion scattering of x-rays by a solid solution of NbC-TaC

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 473-475

TOPIC TAGS: x ray scattering, diffusion scattering, metal physical property

ABSTRACT: A description is given of the method used to prepare the test specimens and the equipment employed to measure the diffusion scattering of X-rays by NbC-TaC specimens. Measurement accuracy was checked with calculated and experimental intensity curves for pure copper and fused quartz. The difference in intensity did not exceed 2-3 electron units per atom throughout the range of angles measured (3-17°). The α_1 coefficients are presented for two coordinate spheres calculated for specimens tested during long isothermal holding at 1700, 1500, and 1200°C. The results of diffusion scattering measurements are presented in graph form. Hardness measurements were made to check the effect of ordering. Orig. art. has: 2 figures, 2 tables.

Card 1/2



L 57812-65
ACCESSION NR: AP5008798

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 18May64 ENCL: 00 SUB CODE: MM, OP

NO REF SOV: 002 OTHER: 003

Card 2/2

L 16807-66 EWT(m)/EPF(n)-2/T/EWP(t) IJP(c) JD/JG

ACC NR: AP6003367 SOURCE CODE: UR/0363/66/002/001/0082/0086

AUTHOR: Umanskiy, Ya. S.; Fadeyeva, V.I.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Effect of WC impurity on short-range phase separation in a TaC-NbC solid solution

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 1, 1966, 82-86

TOPIC TAGS: tungsten carbide, tantalum compound, niobium compound, carbide, solid solution

ABSTRACT: A study was made of the effect of small amounts of a third metallic component (W) on short-range order in the (Ta, Nb)C solid solution and on the kinetics of its establishment as compared to an unalloyed solid solution. One mole % of WC was dissolved in a TaC-NbC solid solution of stoichiometric composition. The intensity distribution of diffuse x-ray scattering caused by the short-range order was determined with a URS-50I diffractometer. The small amount of WC introduced was found to cause local distortions in the alloy, promoting an increase in the diffusional mobility of tantalum

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L 16807-66
ACC NR: AP6003367

and niobium atoms. Calculation of the energies of mixing U of the solid solutions, carried out by using short-range order coefficients α_1, showed that the short-range order observed was an equilibrium one. Measurement of the microhardness, which increased in the presence of WC, also confirmed the presence of short-range order. Orig. art. has: 4 figures, 1 table, and 3 formulas.

SUB CODE: 11, 20 / SUBM DATE: 24May65 / ORIG REF: 004 / OTH REF: 001

Card 2/2 mc

MEL'NIKOV, N.N.; GALASHINA, M.L.; FADEYEVA, V.K.

Selecting preparations for antifouling paints. [Trudy] NIUIF no.164:24-25 '59. (MIRA 15:5)
(Protective coatings)

MEL'NIKOV, N.N.; GALASHINA, M.L.; FADEYEVA, V.K.

Investigation of new effective preparations for cotton defoliation before harvesting. [Trudy] NIUIF no.164:26-27 '59. (MIRA 15:5)
(Cotton) (Defoliation)

KULTYSHEVA, Z.F.; FADEYEVA, V.N.

Diffuse cardiosclerosis. Trudy LSGMI 40:327-332 '58.
(MIRA 12:8)

1. Fakul'tetskaya terapevticheskaya klinika Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta i Kafedra patologicheskoy anatomii Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta (zav. kafedroy - chlen-korrespondent AMN SSSR, prof.V.D.TSinzerling, zav.klinikoy - prof.A.A. Kedrov).

(HEART DISEASE, case reports,
diffuse cardiosclerosis (Rus))

FADEYEVA, V.N.

Morphological changes during croupous pneumonia not treated with sulfonamides or antibiotics [with summary in English]. (MIRA 11:11)
Trudy LSGMI 41:30-42 '58
(PNEUMONIA, LOBAR, pathol.
morphol. changes of lungs in untreated pneumonia (Rus))

FADEYEVA, V.N.

Pathological anatomy of croupous pneumonia treated with sulfonamides and penicillin [with summary in English]. Trudy LSGMI 41:43-54 '58 (MIRA 11:11)

(PNEUMONIA, LOBAR, ther.
penicillin & sulfanilamide, post-ther. pathol. anat. (Rus))
(PENICILLIN, ther. use
pneumonia, lobar, post-ther. pathol. anat. (Rus))
(SULFANILAMIDE, ther. use
same (Rus))

FADEYEVA, V.N., GOL'ZAND, Z.L., FEL', V.Ya.

Morphology of experimental pneumococcal pneumonia in white rats [with summary in English]. Trudy LSGMI 41:245-259 '58 (MIRA 11:11)
(PNEUMONIA, LOBAR, exper.
pneumonococcal, morphol. in rats (Rus))

FADEYEVA, V.N.; FEL', V.Ya.

Effect of penicillin on the morphology of experimental pneumonia induced by pneumococcus of type III. Arkh.pat. 21 no.11:62-67 '59. (MIRA 13:12)

(PNEUMONIA) (PENICILLIN)

FADEYEVA, V.N.; SHAFER, I.I.

Case of teratoma of the stomach. Arkh. pat. 22 no. 12:55-58 '60. (MIRA 14:1)

(STOMACH—TUMORS)

KOROSTOVTSEVA, N.V.; FADEYEVA, V.N. (Leningrad)

Morphological pulmonary changes in deep hypothermia in white rats. Arkh.pat. 23 no.4:32-36 '61. (MIRA 14:6)

1. Iz laboratorii eksperimental'noy patologii (zav. - deystvitel'nyy chlen AMN SSSR prof. I.R. Petrov) Leningradskogo instituta perelivaniya krovi i iz kafedry patologicheskoy anatomii (zav. - chlen-korrespondent AMN SSSR prof. V.D. TSinzerling [deceased]) Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta.
(HYPOTHERMIA) (LUNGS)

FADEYEVA, V.S.

The problem of the application of thermal analyses to the investigation of ceramic ores. V. S. Fadeeva and L. P. Ivanova. *Trudy Issledovatsiya Tekhnol. Proizvodstva Grubol Keram.* 5, 103–29(1951).—Thermograms were obtained by the use of a differential thermocouple assembly and an elec. furnace whose heating rate can be carefully controlled. Standards were set up for kaolinite, monothermite, montmorillonite, various micas (including muscovite, sericite, and hydrous mica), calcite, talc, pyrophyllite, limonite, and quarts. Synthetic mixts. and natural ores are then detd. by comparison with the standards. The principal deflections in the thermograms are: kaolinite 600° (dehydration), 960° (exothermic formation of γ-alumina); monothermite 140° (loss of adsorbed moisture), 600° (dehydration), 930° (γ-alumina formation); montmorillonite 125° (loss of adsorbed moisture), 700° and 830° (dehydration); muscovite 870° (dehydration), 1120° (recrystn.); sericite 620° (dehydration), 1050° (recrystn.); hydrous mica 600° (dehydration), 1000° (unexplained exothermic reaction); calcite 940° (loss of CO_2); talc 990° (dehydration); pyrophyllite 630° (dehydration); limonite 330° (dehydration); quartz 575° ($\beta \rightarrow \alpha$ transformation). Dimensional changes in the solids correspond to these crit. temps. C. H. Fuchsman

CA

Investigation of opaque zirconium glazes with an electron microscope. V. N. Vaileeva and M. K. Yakovleva. *Doklady Akad. Nauk S.S.S.R.* 81, 607-9(1951). Opaque ZrO_2 glazes, contg. 13% ZnO and 12.8% ZrO_2, were fired to 1250–1300°. A polarizing microscope showed small spots in connection with a nonequil. distribution of the crystn. phase. Replicas of the glaze surface were obtained by making lacquer impressions. The optimum thickness of the lacquer replicas was 500-700 A. The lacquer layer was removed from the glaze surface by allowing a gelatin soln. to solidify on the lacquer surface. Since the lacquer has a greater affinity for the gelatin than for the glaze, it was removed with the gelatin. The optical magnification obtained was 20,000–30,000. It was observed that the larger part of the glaze surface contained crystals of Zn spinel, 0.01–6μ in size. These crystals were arranged in groups and occupied about 10% of the total area. Some elongated cubes were shown to consist of zircon crystal. from the melt in the form of idiomorphic crystals. A Debye-gram taken for a given glaze contained, besides a zircon line, also gahnite lines: 1.42 A. (av. intensity) and 2.80 A. (weak intensity). The electron microscope, with the polarizing microscope and x-rays, appears to be an effective means of studying structures of glaze surfaces to det. the causes of flaws, and for the development of new methods of annealing and new types of glazes. Gladys S. Macy

USSR/Engineering - Refractories, Equipment May 52

"Application of the Electron Microscope in Studying Mullite Clinker," P.P. Budnikov, Act Mem, Acad Sci Ukrainian SSR, V.S. Fadeyeva, Cand Tech Sci, Moscow Chem-Technol Inst imeni D.I.Mendeleyev

"Ogneupory" No 5, pp 228-230

Briefly described method for examn of sintered mullite clinkers under electron microscope, including procedure of prepg replicas.

220T40

FADEYEVA, V.S. FADEYEVA, V.S.

FADEYEVA, V.S.

USSR

Electron micrographic investigation of the surface of dull zirconium glazes. V. S. Fadeeva and M. K. Yakovleva. *Trudy Petrog. i Mineral. Akad. Nauk S.S.S.R.* 2, 353-7 (1953).—Opaque Zr-Zn glazes sometimes showed cryst. spots of 1 mm. diam., that were investigated by the replica method, nitrocellulose films being used; the method of prepg. these replica is extensively described. The contrasts of the electron micrographs are improved by shadow-casting with Cr metal vapor in the cathode vacuum tube, under an impact angle of 15°. The thickness of the Cr layer is in max. 70 to 100 A. The photomicrographs show triangular crystal forms of 0.01 to 6 μ diam. that are identified as galinite ($ZnO.Al_2O_3$), with typical {111} forms, and spinel twins. Crystals of andesine and of prismatic zircon, $ZrSiO_4$ (up to 15 μ length) were independently identified by petrographic-microscopic methods. The $ZrSiO_4$ is evidently recrystd. from a soln. in the molten glaze (max. temp. of application 1300°). Galinite and zircon were also identified by their x-ray interference lines. W. Eitel.

FADEYEVA, V.S.

MT

Thermoanalysis of basic clay minerals and their synthetic mixtures. V. S. Fadeeva. *Trudy Vsesoyus. Nauch. Issledovatel. Inst. Stroitel. Keram.* 1953, No. 8, 111–42; *Referat. Zhur., Khim.* 1953, No. 9303.—Complex thermoanalysis is used to study pure clay minerals and their synthetic mixts. Thermograms of pure clay minerals with simultaneous dilatometric recording yield addnl. data for identifying these minerals in the compn. of the clay, by comparing them with the data from complex thermoanalysis of the clay. The data from complex thermoanalysis make it possible to conjecture about the stresses which can develop, as a result of the presence of any clay mineral in the thermal raw material, during the process of firing. A comparison of data from thermoanalysis of certain clays with data on thermoanalysis of synthetic mixts. of the corresponding minerals is of help in deciphering the mineralogical compn. of these clays. Marjorie Ketner

FADEYEVA V.S.

USSR/Chemical Technology. Chemical Products and Their Application - Silicates. Glass. Ceramics. Binders. I-9

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 12505

Author : But T.S., Fadeyeva V.S., Sirotkina N.L.
Inst : Kazan' Filiate of the Academy of Sciences USSR
Title : Use of the Burette of L.G. Berg in the Investigation of Ceramic Materials

Orig Pub : Tr. Kazansk. fil. AN SSSR, SEr. khim. n., 1956, No 3, 89-95

Abstract : The method of L.G. Berg for a quantitative determination of gaseous phase evolved on heating of substances, by measuring its volume, was utilized by the authors to determine hydration water of clays and kaolin, and also the air content of the raw materials. Determination of water by this method is not affected by the presence of carbonate, iron and organic admixtures, and is effected by measuring the volume of hydrogen or acetylene formed

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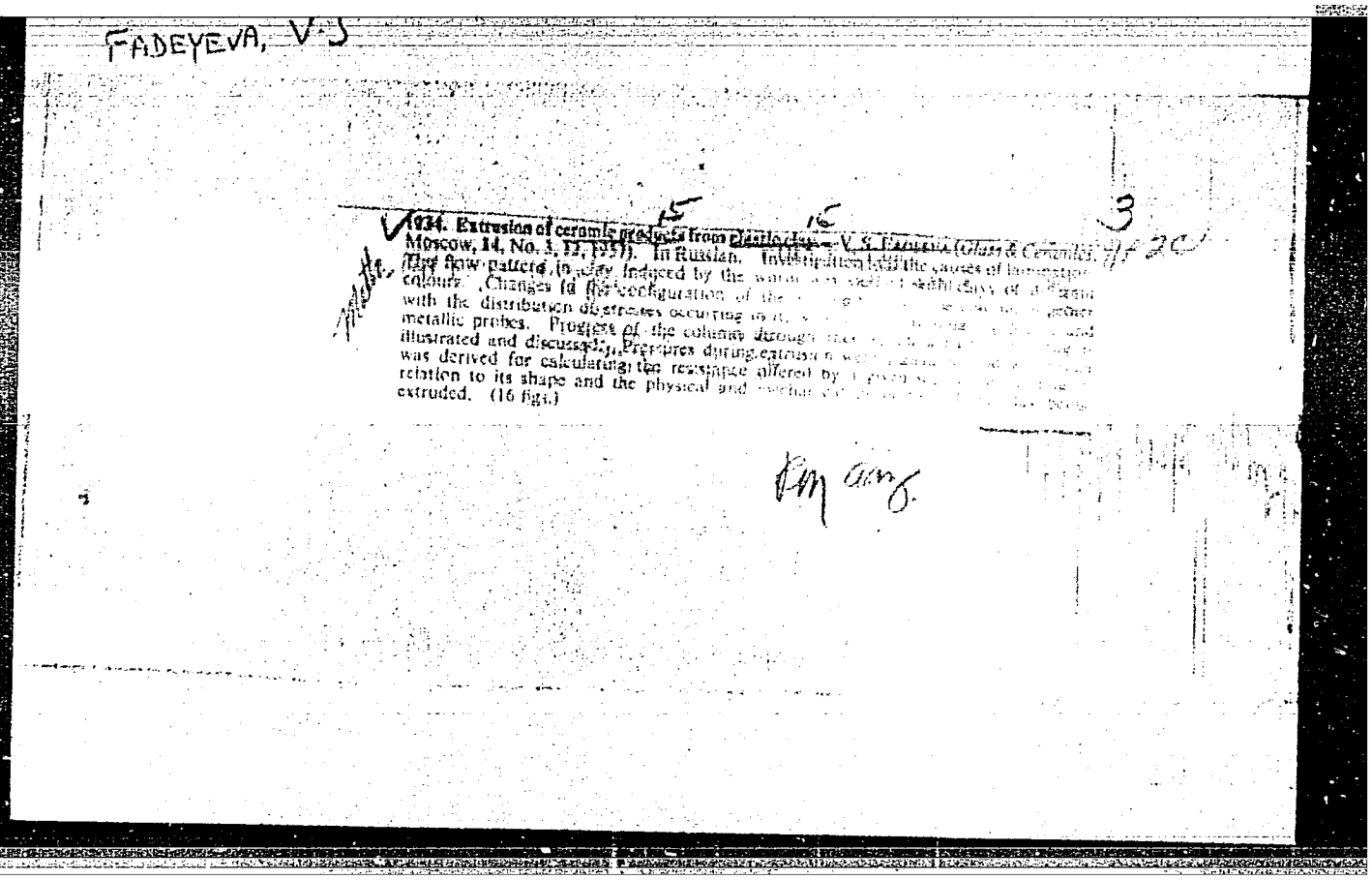
ROST, P.P.; FADEYEVA, V.S.

Shaping attachements of a conveyer-belt press. Stek. i ker.13 no.7:16-23 Jl '56. (MLRA 9:9)
(Ceramic industries--Equipment and supplies)(Conveying machinery)



FADEYEVA, V.S.

15 16 3

1934. Extrusion of ceramic products from plastic clays — V. S. Fadeyeva (Glass & Ceramics, Moscow, 14, No. 1, 12, 1957). In Russian. Investigations into the causes of lamination (flow pattern) in clay induced by the water and [illegible] clays of a plastic colours. Changes in the configuration of the [illegible] with the distribution of stresses occurring in [illegible] metallic probes. Progress of the column through [illegible] illustrated and discussed. Pressures during extrusion [illegible] was derived for calculating the resistance offered by [illegible] relation to its shape and the physical and [illegible] extruded. (16 figs.)

Pm amg.

PHASE YCER, V.3,

Orientation of clay particles in the process of deformation of a clay paste. V. S. Fadeeva (Sci. Research Inst. Building Ceramics, Moscow). *Kolloid. Zhur.* 19, 689-701 (1957). Fine particles of biotite were added to clay pastes (contg. 38% H_2O) as indicators of orientation; they were visible on the cross sections of the paste. Simple compression of the paste (at 1 kg. wt./sq. cm.) caused no orientation, but orientation along the lines of the max. shear occurred in flow and sliding. Also segm. of a watery layer contg. fine particles was visible, e.g., near the solid on which the sliding took place. J. J. Bikerman

15(2)

AUTHOR: Fadeyeva, V. S.

SOV/72-59-8-11/17

TITLE: Optimum Moistness for the Molding of Construction Materials Made of Plastic Dispersion Mass (Optimal'naya vlazhnost' dlya formovaniya stroitel'nykh izdeliy iz plastichnykh dispersnykh mass)

PERIODICAL: Steklo i keramika, 1959, Nr 8, pp 35-39 (USSR)

ABSTRACT: The majority of plastic construction materials are polydispersion systems of particularly high concentration. A number of research workers established the relation between the plastic properties of such substances and the presence of a viscous liquid in them as well as a dispersion phase. The breaking of the compact mass (razryv sploshnosti massy) is observed on the surfaces where the maximum tangential stresses are effective. After the breaking of the compactness the mass enters the state of plastic flow and its composition becomes heterogeneous. The structure of such a mass is to be seen from figure 1. Figure 2 shows the microphotograph of a section of the normal friction surface. The interdependence of normal pressure and the friction coefficient is expressed in a formula and shown in figure 3. All the properties described are due to the viscosity

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of the liquid phase of plastic clay masses and the forces of cohesion acting among its individual elements. Experiments showed that the limiting stress of the mass shift at a moistness corresponding to the maximum molecular capacity of retaining moisture is 2 to 3 times that of the same mass with normal molding moistness. A clay element or aggregate, if placed into water, engages in an interaction (ion exchange) with the water. Apart from that, minute particles detach from the clay surface and form a structural lattice around the pieces, as was stressed on a previous occasion by N. V. Mikhaylov (Footnote 2) in his paper. Figure 4 shows the pattern of the formation of a structural lattice at the surface of a clay piece, figure 5 an electron photograph of such a grid. A. F. Lebedev, M.N. Gol'shteyn, A. M. Vasil'yev, N. K. Tsytovich found that at a pressure of 65-70 kg/cm^2 exerted on the clay mass the main part of its capillary water is removed. The remaining water corresponds to the maximum capillary capacity of retaining moisture of the mass under consideration. The structures of the clay masses in accordance with their mineralogical compositions can be illustrated

by figures 6 and 7. Figures 8 and 9 show the deformation pattern of the masses under the conditions of pure compression. Figures 10 and 11 show the drying diagrams of different clay masses. The process of removing weakly adsorbed water is illustrated by the mass pattern (Fig 12). The author states in conclusion that such a moistness should be regarded as the optimum moistness of plastic masses for molding construction materials as would correspond to the maximum molecular moisture-retaining capacity of these masses. This statement is confirmed by experiments carried out between 1952 and 1955 in cooperation with the VNIIStroydormash on the press of the P. P. Host design. There are 12 figures and 5 Soviet references.

FADEYEVA, V. S.

report presented at the 1st All-Union Congress of Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb '60.

268. L. R. Stavraki (Kuibishev): Strain design and general stability of structures.

269. L. N. Stavrayi (Kuibishev): A general method of solving non-linear problems of structural mechanics.

270. R. D. Stepanov (Moscow): A contribution to the non-linear problem of plate flutter.

271. L. G. Stepanskii, K. P. Onkiev (Moscow): On the use of variational principles for the approximate solution of some problems of plastic equilibrium.

272. A. I. Strelbitskaia (Kiev): Experimental investigation of the oblique bending of steel beams beyond the elastic limit.

273. A. S. Stroganov (Moscow): Strength and visco-plastic flow of soils.

274. G. I. Ter-Stepanian (Erevan): The relation between pore pressure and rate of creep of slopes.

275. L. A. Tolokonnikov (Tula): Finite plastic strains of non-linearly deformed bodies.

276. A. D. Tomlenov (Moscow): Piercing of metals by a spherical punch considering contact friction.

277. Ia. L. Turchinskaia (Moscow): An asymptotic method of designing flexible blades of variable pitch at high speeds of rotation.

278. P. I. Tumar (Moscow): Application of similarity methods to the analysis of the flow of rubber compounds.

279. A. A. Trapeznikov, T. G. Shalopalkina (Moscow): Dependence of the maximum elastic and discontinuous strains of aluminum-naphtenate gels on strain rates.

280. S. A. Tumarkin (Moscow): An asymptotic method for the design of toroidal shells.

281. V. K. Turkin (Moscow): Some problems of soil dynamics.

282. S. V. Tiabin (Kazan): The flow in the boundary layer of an elastic, visco-plastic medium.

283. A. G. Ugodtsikov (Gorkii): Some problems concerning the analysis of stresses in shrink fits.

284. S. V. Uabik (Moscow): On strength and rupture criteria for metals in the presence of stress concentrations.

285. J. J. Ulitskii (Kiev): Some problems of non-linear ...

286. A. A. Umanskii (Moscow): Analogy and model methods in problems of structural mechanics concerning bars and thin-walled structures.

287. M. T. Urazbaev (Tashkent): The problem of seismic strength of fluid supported hydraulic structures.

288. Ia. S. Ufliand (Leningrad): Application of integral transformations to the solution of some problems concerning an elastic wedge.

289. V. S. Fadeyeva (Moscow): Deformations of plastic clays in moulding.

290. I. V. Fadeev (Moscow): Elastic-plastic equilibrium of an acute granular wedge.

291. M. L. Feldman (Dnepropetrovsk): Stability and vibrations of orthotropic plates of variable thickness.

292. A. P. Filippov (Kharkov): Extensional vibrations of turbine discs.

293. M. M. Filonenko-Borodich (Moscow): On the possibility of generalizing the Mohr and Huber-Mises-Hencky theories of rupture.

294. E. P. Fleishman (Lvov): Some problems concerning the bending of plates and shells with stiffeners.

295. L. M. Flitman (Moscow): On the impact of a wave on a heavy rigid sphere embedded in an elastic medium.

296. V. A. Florin (Leningrad): Some problems concerning rock formations of hydraulic structures.

297. V. A. Florin (Leningrad): Present state and problems of soil mechanics.

298. V. A. Florin (Leningrad): Flow conditions for saturated sands.

299. F. V. Florina (Leningrad): Experimental study of real and apparent friction in vibrating soils.

300. B. E. Fradlin, S. M. Shakhnovskii (Kiev): On the construction of Green's functions for the equilibrium problem of shallow shells.

301. S. S. Fraifeld (Kharkov): Further development of the initial rheological equation.

302. V. M. Frolov (Moscow): Temperature stresses in cantilever plates and their effect on stiffness.

GUTKIN, A.M., kand.fiz.-matem.nauk; SUSHKIN, N.G., kand.tekhn.nauk;
FADEYEVA, V.S., kand.tekhn.nauk; SHCHERBAKOVA, Ye.A., assistent

Separation of fine fractions with the help of an electron microscope. Sbor. trud. VNIINSM no.2:130-161 '60. (MIRA 15:1)
(Binding materials)
(Electron microscope)

FADEYEVA, V.S., kand.tekhn.nauk; KOSHKIN, V.G., kand.tekhn.nauk;
MAKOTINSKIY, M.P., kand.tekhn.nauk

Method of determining the colorfastness of materials for unstained floors. Sbor. trud. VNIINSM no.2:162-173 '60.
(MIRA 15:1)

(Floor coverings)

FADEYEVA, Vera Sevast'yanovna; VOLAROVICH, M.P., doktor fiz.-mat. nauk, prof., nauchnyy red.; ABUTKINA, E.I., red. izd-va; RUDAKOVA, N.I., tekhn. red.

[Shapability of dispersed plastic materials] Formuemost' plastichnykh dispersnykh mass. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam, 1961. 126 p.
(MIRA 14:9)

(Building materials—Testing)

FADEYEVA, V.S.

Composition of ceramic batches based on formative capacity.
Stek.i ker. 18 no.8:22-26 Ag '61. (MIRA 14:8)
(Ceramics)

ZAYTSEV, A.G.; FADEYEVA, V.S.; KOPCHIKOVA, N.V.

Method of studying the structure of polymeric and porous building materials. Sbor. trud. VNIINSM no.4:4-12 '61. (MIRA 15:2)

(Building materials)
(Electron microscope)

FADEYEVA, V.S.

Deformability and anisotropy of plastic dispersed masses.
Sbor. trud. VNIINSM no.4:13-21 '61. (MIRA 15:2)
(Building materials—Testing)

VINOGRADOV, B.N.; FADEYEVA, V.S.; ELINZON, M.P.

Effect of the roasting and cooling cycle on the phase composition, structure, and strength of agloporite. Sbor. trud. VNIINSM no.4:45-55 '61. (MIRA 15:2)
(Aggregates (Building materials)—Testing)

FADEYEVA, V.S.; DIKANOVA, N.A.

Determination of the coefficient of friction and durability in the wear of the surface layer of floor coverings. Sbor. trud. VNIINSM no.4:95-104 '61. (MIRA 15:2)
(Floor coverings--Testing)

FADEYEVA, V.S.

FAEYEVA, V.S.; DYATLOVA, V.P.; DIKANOVA, N.A.; YANTIKOVA, M.P.

Rapid method of determining the consistency of adhesive cements for floors. Sbor. trud. VNIINSM no.4:105-113 '61. (MIRA 15:2)

(Cements, Adhesive—Testing)

BUT, T.S.; VINOGRADOV, B.N.; GAVRILOVA, T.I.; GORSHKOV, V.S.; DOLGOPOLOV, N.N.; MYAGKOVA, M.A.; SIROTKINA, N.L.; FADEYEVA, V.S., doktor tekhn. nauk, red.; GURVICH, E.A., red. izd-va; GOL'BERG, T.M., tekhn. red.

[Modern methods of studying building materials]Sovremennye metody issledovaniia stroitel'nykh materialov [By] T.S.But i dr. Pod obshchei red. V.S.Fadeevoi. Moskva, Gosstroiizdat, 1962. 238 p. (MIRA 16:1)

(Building materials)

FADEYEVA, V.S., doktor tekhn. nauk; KOZHEIN, V.G., kand. tekhn. nauk, MANDRUKOVA, V.I., inzh.

Extrusion of building fittings. Sbor. trud. VNIINSM no.8: 5-16 '63. (MIRA 17:9)

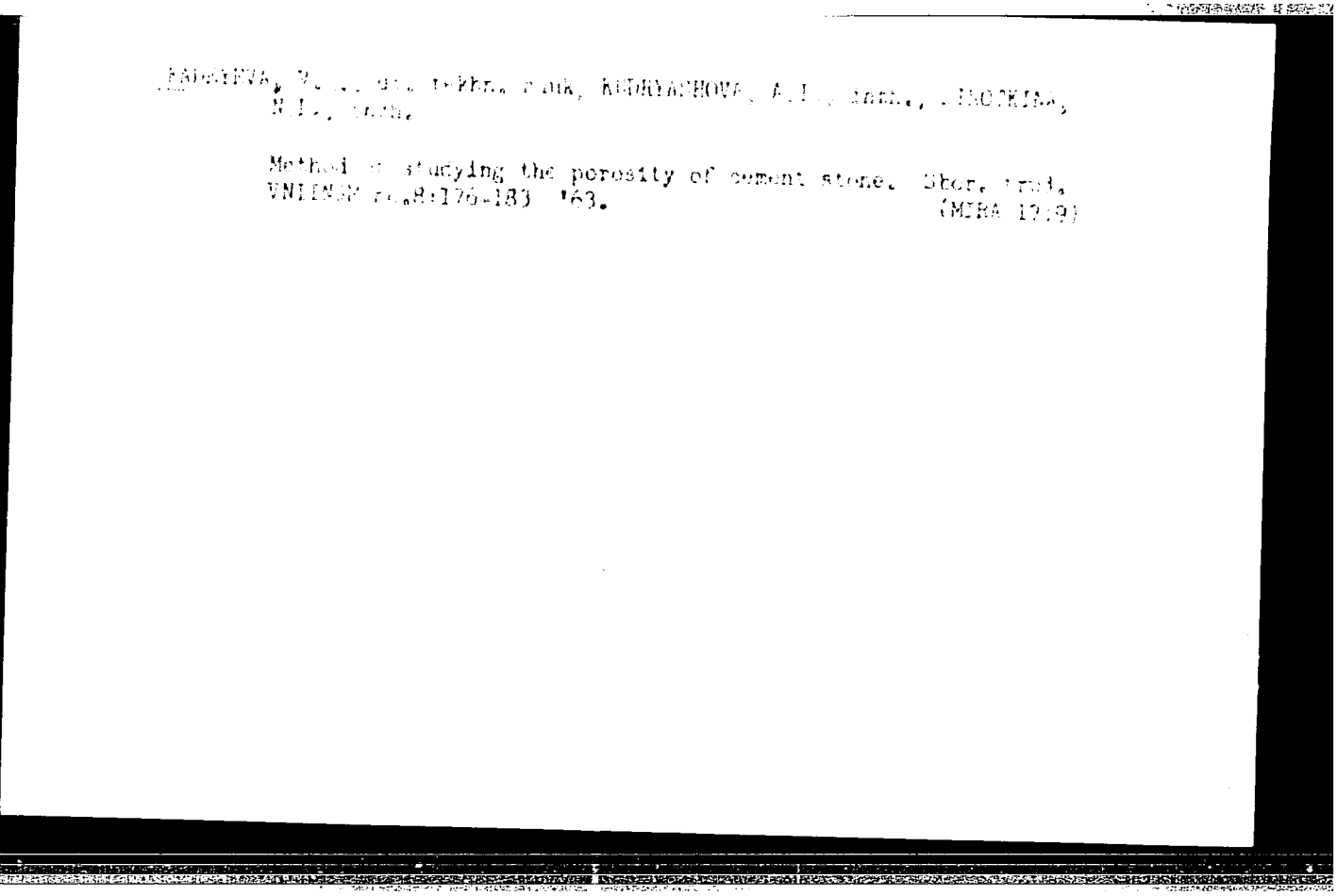
FADEYEVA, V.S., dr. tekhn. nauk; VINOGRALOV, B.N., inzh.

Phase conversions and structure formation during the kilning of keramzit. Sbor. trud. VNI NSM no.8:75-83 '63.

(MIRA 17:9)

FALEYEVA, V.S., dr. tekhn. nauk, ZHITENSKAYA, F.D., kand. tekhn. nauk;
DIKANOVA, N.A., inzh.

Quick method of estimating the viscosity of mastics, glues, and paints. Sbor. trud. VNIINSM no.8:134-145 '63.
(MIRA 17:9)



[illegible], V. [illegible], [illegible] Rank, MIKHAYLOVA, A. I., [illegible], [illegible], N. I., [illegible].

Method of studying the porosity of cement stone. Stek. i tsel. VNIINSM [illegible] no.8:176-183 '63. (MIRA 17:9)

FALEYEVA, V.S., doktor tekhn. nauk; GERSHKOVICH, B.I., inzh.; SHAPIRO, T.M., inzh.

Deformation of structural plastics in machinery and rheological instruments. Stroi. mat. 11 no.5:25-27 My '65. (MIRA 18:9)

BOGATOVA, G.P.; DROBININ, O.I.; CHEREMISINOVA, I.P.; NADEZHINA, G.A., red.; FADEYEVA, Ye.I., red.

[Books on the chemization of the national economy; lists recommended for district and rural libraries] Knigi po khimizatsii narodnogo khoziaistva; rekomendatel'nye spiski dlia raionnykh i sel'skikh bibliotek. Moskva, Izd-vo "Kniga," 1964. 23 p. (MIRA 18:1)

1. Moscow. Publichnaya biblioteka.

NESIS, A.I.; VINARIK, E.M.; DVOYRIN, V.L.; DZHANGOZINA, D.M.;
KLYATSKINA, I.Ye.; FADEYEVA, Ye.I.; SHLAYDMAN, I.M.; IVAKINA, T.P.

Regression of experimental silicosis under the influence of hydrocortisone. Izv. AN Kazakh. SSR Ser. med. nauk 11 no.3: 44-49 '64 (MIRA 18:1)

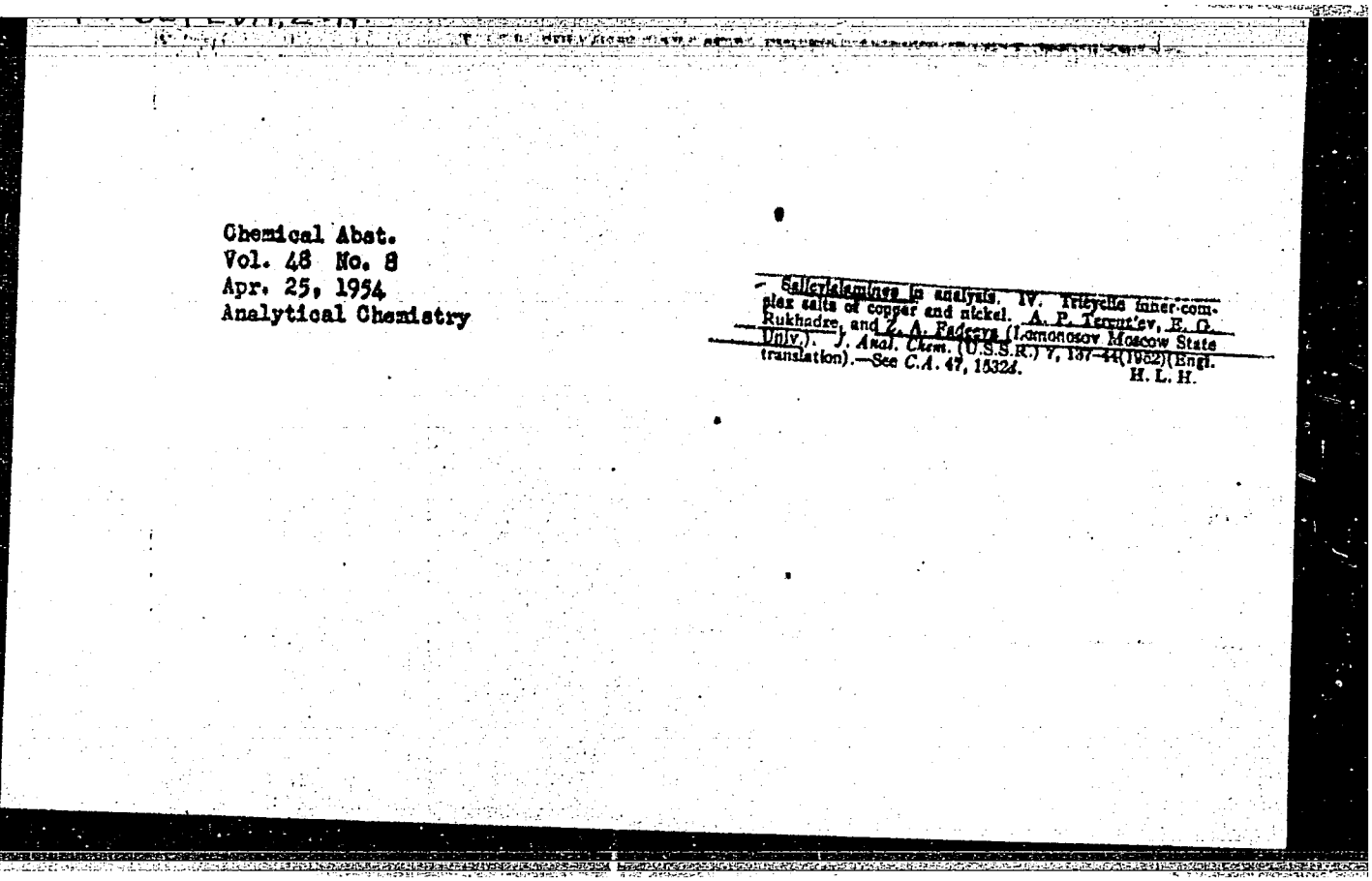
FADEYEVA, Ye.N. (Khar'kov)

Importance of visual methods in teaching physiology. Fel'd. i akush. no.8:54-55 Ag '54. (MLRA 7:8)
(PHYSIOLOGY, education
visual way)

FADEYEVA, Ye.N., prepodavatel' fiziologii

Organization of a club is one form of extracurricular work in a medical school. Med.sestra 21 no.10:57-58 O '62. (MIRA 16:4)

1. Khar'kovskiy meditsinskiy institut.
(MEDICINE--STUDY AND TEACHING)



Chemical Abst.
Vol. 48 No. 8
Apr. 25, 1954
Analytical Chemistry

Salicylaldimines in analysis. IV. Tricyclic inner-complex salts of copper and nickel. A. P. Terent'ev, E. G. Rukhadze, and Z. A. Fadeeva (Lomonosov Moscow State Univ.). *J. Anal. Chem.* (U.S.S.R.) 7, 137–44(1952)(Engl. translation).—See *C.A.* 47, 1532*d*.
H. L. H.

FADEYEVA, Z.D.

Work of a regional studies club. Geog. v shkole no.4:53-54 Jl-Ag '47. (MLRA 9:6)
(Geography--Study and teaching)

FADEYEVA, Z.M.

Prophylaxis of occupational intoxications in the work of motor testing shops. Gig.truda i prof.zab. 3 no.3:42-45 My-Je '59. (MIRA 12:10)

(MACHINERY--TESTING)
(CARBON MONOXIDE--TOXICOLOGY)
(LEAD POISONING)

FADEYKINA, S.A., starshaya med. sestra (Alma-Ata)

Case for sending specimens to laboratories in cold weather.
Med.sestra 17 no.5:28-29 My '58 (MIRA 11:6)
(MEDICAL INSTRUMENTS AND APPARATUS)

FADIN, D. (Dnepropetrovsk)

Cheap meat. Obshchest.pit. no.3:31-32 Mr '62. (MIRA 15:4)

1. Korrespondent zhurnala "Obshchestvennoye pitaniye".
(Dnepropetrovsk Province--Swine breeding)

FADIN, I. A., Cand of Agric Sci -- (diss) "Cultivation of spruce trees in rural and urban regions of Soviet Carpathia." Minsk, 1957, 22 pp (Belorussian Forestry Engineering Institute im S. M. Kirov), 100 copies (KL, 32-57, 95)

KHAMITOV, T., tekhnik-stroitel'; GOLOVKO, V., inzh.; FADIN, N.

Readers' letters. Sel'.stroi. 14 no.8:29 Ag '59.
(MIRA 12:12)

1. Baltachevskaya raysel'khozinspektsiya, Bashkirskaya ASSR, (for Khamitov). 2. Nachal'nik otdela po stroitel'stvu v kolkhozakh Starorusskogo rayona Novgorodskoy oblasti (for Fadin).
(Farm buildings)

FADIN, L. (Klaypeda)

Replacement of the needle of a phonograph pickup. Radio no.12:46 D '62. (MIRA 16:3)

(Phonograph)

FADIN, N.

For high quality in housing construction. Zhil. stroi. no.9:20-21 '62. (MIRA 16:2)

1. Zamestitel' predsedatelya ispolnitel'nogo komiteta Volgogradskogo gorodskogo Soveta deputatov trudyashchikhsya.
(Volgograd—Construction industry)

FADIN, P.L.

Modernization of the trimmer. Der.prom. 11 no.11:21-22 N '62.
(MIRA 15:12)
(Woodworking machinery)

FADIN,P.L.

Electric drive for clamped frame cars. Der.prom.4 no.9:26-27 S'55.
(MLRA 8:11)

1. Leningradskiy gidrolizuyy zavod
(Saw mills)

FADIN, P.L.

Improving the DR-5 chipper. Gidroliz. i lesokhim. prom. 9 no.7:21 '56. (MIRA 12:3)

1. Leningradskiy gidrolizuyy zavod.
(Wood-using industries--Equipment and supplies)

FADIN, V., inzhener; FADIN, Ye., inzhener.

Automatic control. Tekh.mol.24 no.6:16-18 Ja '56. (MLRA 9:9)
(Automatic control)

AUTHORS: Fadin, V.; Toptunov, V. SOV-107-58-9-30/38

TITLE: ~~Using Contact~~ Rivets for Wiring (Montazh pri pomoshchi kontaktnykh zaklepok)

PERIODICAL: Radio, 1958, Nr 9, pp 49 (USSR)

ABSTRACT: For compact wiring of miniature radio apparatus, countersunk holes are drilled at contact points in the pertinax panel. Hollow rivets cut from brass or copper tube are inserted in the hole and splayed out. The holes are then soldered up. The wire from the various components can then be inserted into the contact points from both sides of the panel and a reliable, compact joint ensured. There are 3 figures.

1. Radio equipment--Construction 2. Rivets--Applications
3. Soldered joints

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(

06440
SOV/107-59-5-35/51

AUTHORS: Fadin, V., Toptunov, V., Illarionov, K.

TITLE: A Transistorized LF Amplifier

PERIODICAL: Radio, 1959, Nr 5, p 46 (USSR)

ABSTRACT: A three-stage, four-transistor amplifier with a 2-watt output is described. The frequency pass band ranges from 100 to 13,000 cycles at an irregularity of 9 db. The amplifier has a power consumption of 12 watts at 220 or 110 volts ac. There are two pre-amplifier stages and one push-pull output stage. The first pre-amplifier stage consists of P1Ye germanium junction transistor with a grounded collector. The second pre-amplifier stage consists of one P1Ye transistor with a grounded emitter, facilitating a simple matching of this stage with the preceding one and providing great amplification. The output stage consists of two P3V transistors with grounded emitters. The coupling between the pre-amplifier stages and the output

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A Transistorized LF Amplifier

06440
SOV/107-59-5-35/51

stage is achieved by a transformer. Figure 1 shows the circuit diagram of this amplifier. Two one-watt loudspeakers may be connected to the output. The amplifier is designed for use with a record player and has tone color controls. Transformer data are given. The amplifier may be mounted on a panel of 150x70 mm. There is 1 circuit diagram, 1 graph, 1 diagram and 1 Soviet reference.

Card 2/2

FADIN, V (g. Leningrad)

"Kriotron." Radio no.8:18-19 Ag '61.
(Electronic calculating machines) (MIRA 14:10)

GEYYER, V.G., prof.; TIMOSHENKO, G.M., inzh.; FADIN, V.A., inzh.

Automatic control of coal-suction equipment in hydraulic mining.
Ugol' Ukr. 3 no.8:28-30 Ag '59. (MIRA 12:12)

1.Donetskiy industrial'nyy institut.
(Hydraulic mining) (Automatic control)

GEYYER, V.G., doktor tekhn.nauk; TIMOSHENKO, G.M., kand.tekhn.nauk;
FADIN, V.A., assistent

Automation of pumping stations in hydraulic mines. Mekh. i avtom. proizv. 16 no.1:31-34 Ja '62. (MIRA 15:1)
(Electronic control)
(Hydraulic mining--Equipment and supplies)

ZUBOV, P.I.; SUKHAREVA, L.A.; FADIN, V.A.; KISELEV, M.R.

Internal stresses arising during film formation from phenol-formaldehyde resin. Koll. zhur. 25 no.4:434-437 Jl-Ag '63. (MIRA 17:2)

1. Institut fizicheskoy khimii AN SSSR, Moskva.

FADIN, V.K.

Work training in the schools of Sweden. Politekh. obuch. no.10: 88-91.0 '57. (MLRA 10:9)

(Sweden--Technical education)

S/139/60/000/006/005/032
E073/E335

AUTHORS: Bol'shanina, M.A. and Fadin, V.P.

TITLE: On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1960, No. 6, pp. 38 - 43 + 1 plate

TEXT: It is known (Refs. 1-6) that for many technically pure metals the flow curves which are plotted in the coordinates stress-equivalent deformation, for various types of deformation, are in good agreement. Thus, according to these authors, one of the important characteristics of the material-the yield point expressed as a function of the equivalent deformation, can be considered as not being dependent on the type of deformation for commercially pure metals. On the other hand, a number of other authors (Refs. 7-11) consider that all the physical properties of metals are linked to some extent with the presence in them of collectivised conductivity electrons.

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On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

Therefore, it is of interest whether other non-mechanical characteristics of the material do depend on the type of plastic deformation if expressed as a function of the equivalent deformation. In particular, it would be of interest to study this dependence for the specific electric resistance of metals. Furthermore, it is of interest to compare the changes as a result of plastic deformation in the mechanical and electric properties of metals for elucidating whether there is a similarity in the change of these properties during plastic deformation. The experiments were carried out on wire specimens of commercially pure Mo, Ni and Zn, 12-15 cm long, 1 mm dia. (Mo and Ni) and 1.5 mm dia. (Zn). The nickel specimens were preliminarily vacuum-annealed at 850 °C for 1 hour; the Mo specimens were also vacuum-annealed, at 1150 °C

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On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

for 10 min. The electric resistance was measured by means of a double Thomson bridge with an accuracy of up to 10^{-5} ohm, the length was measured by means of a comparator with an accuracy of up to 0.01 mm, the mass was weighed with an accuracy of up to 10^{-4} g. It was assumed that during deformation the density did not change. The properties during torsion and tension were compared on the basis of equivalent deformations calculated by three methods, using the formula of Taylor and Quinney (Ref. 4) and relations proposed by Nadai (Ref. 12). Figs. 1, 2 and 6 show the dependence of the electric resistance $P(\mu\Omega_2 cm)$ and the resistance to plastic deformation $t_n(kg/mm^2)$ on the octahedric displacement in torsion and in tension. The following conclusions are arrived at; 1) For Ni and Mo no

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On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

generalised curves of the specific electric resistance versus equivalent deformation exist; the curves depend on the type of deformation, those for torsion being higher than those for tension. 2) The flow curves of Mo and Zn depend on the type of the stress state whereby the curves for torsion are also higher than the curves for tension. 3) Probably there is no similarity between the change in the mechanical properties and the electric resistance during plastic deformation of Zn, Mo and Ni. 4) The least divergence of the flow curves as well as of the curves of the specific electric resistance are observed in the case that octahedric strains are applied as a means for measuring the equivalent deformation.

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S/139/60/000/006/005/032
E073/E335

On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

There are 6 figures and 13 references: 9 Soviet and 4 non-Soviet.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosuniversitete im. V. V. Kuybysheva (Siberian Physico-Technical Institute of Tomsk State University imeni V. V. Kuybyshev)

SUBMITTED: December 4, 1959

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S/139/60/000/006/005/032
E073/E335

On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

Fig.1

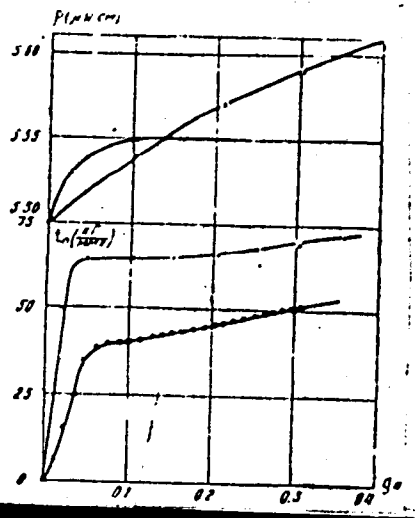
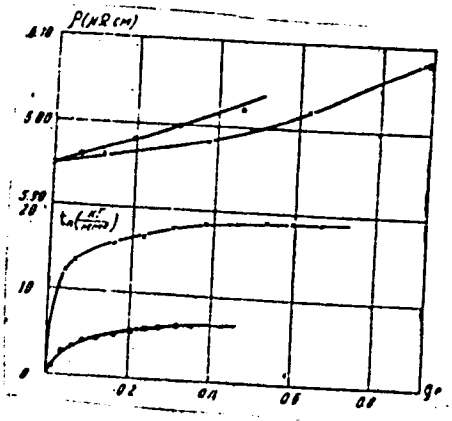


Fig.2



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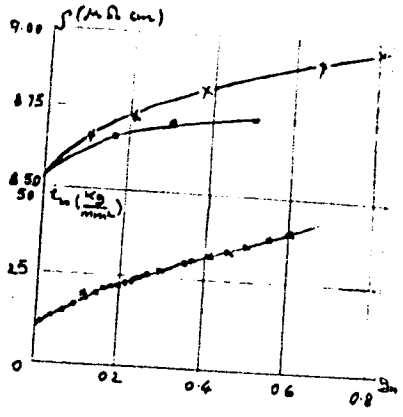
S/139/60/000/006/005/032
E073/E335

On the Dependence of the Electric Resistance and the Resistance to Plastic Deformation in Molybdenum, Nickel and Zinc on the Equivalent Deformation During Torsion and Tension

Fig.6



Card 7/7

PANIN, V. Ye.; FADIN, V. P.; DUDAREV, Ye. F.

Variation of the electric resistance of Cu-Al solid solutions during heat treatment. Izv. vys. ucheb. zav.; fiz. no.6:48-51 '61. (MIRA 16:1)

1. Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosudarstvennom universitet imeni Kuybysheva.

(Copper-aluminum alloys—Electric properties)
(Metals at high temperatures)

S/139/62/000/003/018/021
E193/E383

AUTHORS: Panin, V.Ye., Fadin, V.P., Bobyreva, G.A.

TITLE: The effect of purity of the alloy on the character of ordering in solid Cu-Al solutions. I

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, no. 3, 1962, 153 - 159

TEXT: It has been established in the course of several earlier investigations that the disorder-order transformation in Cu-Al alloys can be considerably affected by the degree of purity of the alloy. Since they were indications that P was one of the impurities responsible for the different.behaviour of various specimens, the investigation described in the present paper was undertaken to study the effect of trace quantities of this element on the ordering transformation in the alloy under consideration. The experimental materials comprised a high-purity vacuum-melted alloy containing 14.3 at.% Al and two commercial-grade alloys containing 14.9 at.% Al and 0.025 or 0.7 wt.% P. Various test pieces were heated in vacuum at temperatures ranging from 100 - 800 °C and then cooled in air or

water-quenched, after which they were aged isothermally at various temperatures or heated slowly through the disorder-order transformation range, the progress of the ordering transformation being studied by measuring the electrical resistivity and determining the temperature-dependence of both the electrical resistivity and specific heat of the test pieces. The activation energy of the process studied was also determined. Several conclusions were reached.

1) The disorder-order transformation temperature range is greatly affected by the degree of purity of the alloy and is shifted towards a higher temperature with increasing impurity content. Thus, for instance, the temperature corresponding to the maximum intensity of ordering in specimens containing 0.025 and 0.07% P, quenched from 500 °C and heated at a rate of 0.6 °C/min, was 137 and 227 °C, respectively.

2) With increasing P content, the activation energy for ordering in Cu-Al alloys increases, amounting to approximately 17 kcal/mole for the pure (P-free) material and 26 and 35 kcal/mole for specimens containing 0.025 and 0.07% P, respectively.

The effect of purity ....

3. If sufficiently high (greater than 400 °C) quenching temperatures are employed, the activation energy for ordering is independent of the quenching temperature and depends only on the degree of purity of the alloy. Under these conditions, the activation energy for ordering is determined by the activation energy for the movement of vacancies in the alloy of a given composition.
4) The concentration of excess vacancies in alloys quenched from relatively low temperatures is low and under these conditions the thermal equilibrium vacancies begin to play a significant part in the ordering process; at the same time, the activation energy for ordering increases.
5) By adding trace quantities of P to Cu-Al alloys, it is possible to decrease the atomic mobility of these alloys which, as a result, can retain their disordered structure under conditions in which ordering would take place in high-purity material.

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The effect of purity ....

S/139/62/000/003/018/021
E193/E383

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosuniversitete imeni V.V. Kuybysheva (Siberian Physicotechnical Institute of Tomsk State University imeni V.V. Kuybyshev)

SUBMITTED: November 30, 1961

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FADIN, V.P.

Nature of changes in the residual electric resistance of Cu-Al solid solutions. Izv.vys.uch.zav.; fiz. no.4:75-78 '62. (MIRA 15:9)

1. Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosudarstvennom universitete imeni V.V. Kuybysheva.
(Solutions, Solid) (Electric resistance)

S/139/62/000/006/008/032
E193/E383

AUTHORS: Panin, V.Ye., Fadin, V.P. and Dudarev, Ye.F.

TITLE: On the problem of the nature of the changes of electrical resistivity of Cu-Al solid solutions during heat-treatment

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, no. 6, 1962, 48 - 51

TEXT: According to Coles' theory, the electrical resistivity ρ of nonferromagnetic alloys at a given temperature T is given approximately by:

$$\rho = F(P_A + P_T) \qquad (1)$$

where P_A and P_T are scattering disturbances due, respectively, to atomic and thermal disordering and F is a function of the degree of freedom of the conduction electrons. For an alloy quenched from a temperature T_3 and for $T = 0\ ^oK$, Eq. (1) becomes:

$$\rho_0^{T_3} = F^{T_3} \cdot P_A^{T_3} \qquad (2);$$

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here, ρ_0 is the residual resistance and the index T_3 indicates the temperature from which the alloy has been quenched. Combining Eq. (2) with the equation for the temperature coefficient of electrical resistivity:

$$\alpha^{T_3} = (\partial\rho/\partial T)^{T_3} ,$$

it can be shown that:

$$\alpha^{T_3} = K^{T_3}_{\theta} F^{T_3} \qquad (4) ,$$

where $k^{T_3}_{\theta} = \partial P^{T_3}_{T} / \partial T$. Since it is easy to show that the relative variation in $k^{T_3}_{\theta}$ is equal to the relative variation in Young's modulus, the variation in the latter property as a function of the degree of order in a Cu-Al alloy was studied. Experimental work was carried out on two alloys: a high-purity Cu+14.3 at.% Al alloy and a technical-grade Cu+14.9 at.% Al material, both preliminarily annealed by holding for 2 h at 750 °C and cooling at 50 °C/h. The Young modulus was determined by measuring the natural vibration frequency of specimens quenched from various

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temperatures T_3 . To determine $P_A^{T_3}$ and F^{T_3} from Eqs. (2) and (4), ρ of the specimens was measured at 293 and 80 °K; a straight line $\rho = a + bT$ was then obtained for each specimen which, on extrapolating to $T = 0$ °K, gave the value of ρ_o ; the slope of these curves gave the average value of $\alpha^{T_3} = (\partial\rho/\partial T)$. The results are reproduced graphically. The Young modulus (E, kg/mm^2) of the Cu+14.3 at.% Al alloy is plotted in Fig. 1 against the quenching temperature (T_3, °C). In Fig. 2, $P_A^{T_3}$ (lefthand scale, curves 3, 4) and F^{T_3} (righthand scale, curves 1, 2) are similarly plotted against the quenching temperature (T_3, °C) of pure (curves 1, 3) and technical-grade (curves 2, 4) alloys. Conclusions: 1) the changes in the electrical resistivity accompanying the variation in the degree of order in Cu-Al alloys are associated mainly with configurational redistribution of atoms, the changes in the structure of the Brillouin zones playing a much lesser part. 2) In common with the variation in other properties during the order-disorder transformation, the E/T_3 curve has a minimum. 3) The change brought about in

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the forces of atomic interaction by the order-disorder transformation in the Cu-Al alloys is very small, not exceeding 3%, for alloys quenched from 450 °C. There are 2 figures.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosuniversitete imeni V.V. Kuybysheva (Siberian Physicotechnical Institute of Tomsk State University imeni V.V. Kuybyshev)

SUBMITTED: January 23, 1962

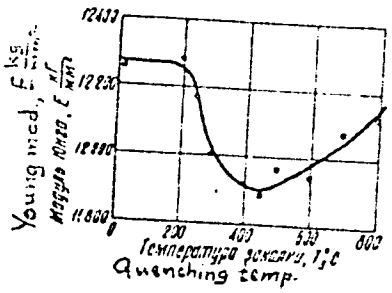

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Fig. 1:

PANIN, V.Ye.; ZENKOVA, E.K.; FADIN, V.P.

Investigating the phenomena of ordering in Cu-Al alloys. Fiz.met.i metalloved. 13 no.1:86-92 Ja '62. (MIRA 15:3)

1. Sibirskiy fiziko-tekhnicheskiy nauchno-issledovatel'skiy institut.

(Copper-aluminum alloys—Metallography)

FADIN, V. P.; PANIN, V. Ye.

Effect of purity on the nature of ordering in Cu-Al solid solutions. Part 2. Izv. vys. ucheb. zav.; fiz. no.6:85-89 '62. (MIRA 16:1)

1. Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosudarstvennom universitete imeni Kuybysheva.

(Copper-aluminum alloys)
(Physical metallurgy)

PANIN, V.Ye.; FADIN, V.P.; SOLOV'YEV, L.A.

Investigating the ordering phenomena in Cu-Al alloys. Fiz. met. i metalloved. 13 no.2:219-224 F '62. (MIRA 15:3)

1. Sibirskiy fiziko-tekhnicheskiy institut.
(Copper-aluminum alloys--Metallography) (Solubility)

S/126/62/013/006/008/018
E193/E383

AUTHORS: Panin, V.Ye., Fadin, V.P. and Dudarev, Ye.F.

TITLE: The effect of the quenching temperature on the kinetics of ordering in Cu-Al solid solutions

PERIODICAL: Fizika metallov i metallovedeniye, v. 13, no. 6, 1962, 886 - 893

TEXT: It has already been established that the electrical resistivity ρ of annealed Al-Cu alloys changes after quenching; at first, as the quenching temperature T_k increases ρ also increases, reaching a maximum at T_k = 400 °C, and then decreases again to a value which after quenching from sufficiently high T_k may be lower than that of the annealed material. This anomalous behaviour indicates that Cu-Al alloys quenched from high temperatures are in a complex structural state, the nature of which has not yet been elucidated. The object of the present investigation was to study the effect of T_k on the kinetics of ordering of quenched specimens during subsequent heating. To this

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end, wire specimens (1 mm in diameter) of a Cu-Al alloy containing 14.3 at.% Al were quenched from 320, 600 and 900 °C and then either aged isothermally at various temperatures or heated up to 300 °C at heating rates of 0.6 and 6 °C per minute, electrical-resistance measurements being used to follow the resultant structural changes. The effect of T_k on the kinetics of ordering is clearly demonstrated in Fig. 1, where ρ ($\mu\Omega$.cm) of various specimens is plotted against the ageing time (hours) at 1 - 130°C, 2 - 150 °C, 3 - 180 °C, 4 - 200 °C, 1' - 60 °C, 2' - 90 °C, 3' - 100 °C and 4' - 130 °C, curves 1, 2, 3 and 4 relating to alloys quenched from 320 °C and 1', 2', 3' and 4' to alloys quenched from 600 °C; the broken horizontal line indicates the value of ρ of the annealed material. The activation energy for ordering was calculated to be about 21 kcal/mole for specimens quenched from 320 °C and 16.7 kcal/mole for those quenched from 600 °C. This difference was attributed to the fact that whereas ordering in specimens quenched from high temperatures is governed mainly by the high concentration of quenched-in vacancies, ordering in material quenched from

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relatively low temperatures depends mainly on thermal vacancies. Increasing the value of T_k above 400 °C had practically no effect on the activation energy which, for specimens quenched from 900 °C, was about 16.7 kcal/mole. The rate of isothermal ordering of specimens quenched from 900 °C was also similar to that of specimens quenched from 600 °C; in this case, however, it was observed that side-by-side with ordering, which caused a decrease in ρ, another process leading to an increase in ρ took place. Although the nature of this second process cannot yet be explained, it indicates that changes other than order-disorder transformation take place in the alloy studied when it is heated to and quenched from temperatures equal to or greater than 900 °C; the fact that the alloy after this treatment becomes more difficult to age and that the difference in hardness between the material of the grains and the grain-boundary regions increases would indicate that redistribtuion of Al atoms takes place under these conditions. The results of isothermal studies were confirmed by the results of experiments in which quenched specimens were heated at a constant rate through a range of temperatures. In

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this case, however, it was found that the rate of ordering depended also on the rate of heating. On increasing the rate of heating, the temperature at which ordering began was shifted towards higher values. The results of the present investigation indicate clearly the importance of selecting the correct quenching temperature in studies of the disorder-order transformations and, particularly, of avoiding too high quenching temperatures. There are 3 figures and 1 table.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom gosuniversitete (Siberian Physico-technical Institute of Tomsk State University)

SUBMITTED: July 19, 1961

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S/126/62/014/001/004/018
E193/E383

AUTHORS: Fadin, V.P., Panin, V.Ye. and Dudarev, Ye.F.

TITLE: A study of the nature of the change of state of Cu-Al solid solutions during heat-treatment

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 1, 1962, 35 - 40

TEXT: In spite of extensive studies on this subject, the nature of the solid-state transformations in Cu-Al alloys has not yet been fully elucidated. Although the majority of workers associate these changes with the variation of short-range order in alloys of this type, it has been postulated that excess vacancies also play an important part in these phenomena, the problem being complicated by the fact that in alloys of compositions near to the solid-solubility limits, secondary processes, associated with changes in the solid-solubility limit, may take place - hence the present investigation, in which the changes taking place in a Cu - 14.3 at.% Al alloy were studied with the aid of electrical-resistivity and specific-gravity measurements. All the test pieces were given

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preliminary vacuum heat-treatment, consisting of 2 h at 750 °C followed by cooling at a rate of 50 °C/h. In the first series of experiments the kinetics of disorder-order transformation were studied on specimens which, after quenching from 600 °C (to ensure formation of excess vacancies) had been held for 1 h at 100 °C which, according to the present authors, was sufficient to bring the alloy to the state of equilibrium. The results are reproduced in Fig. 1, where the electrical resistivity (, μΩ·cm) is plotted against time (min) at 130, 150, 180, 200, 250 and 300 °C (curves 1-6, respectively); curve 7 represents the kinetics of the order-disorder transformation in specimens ordered by quenching from 320 °C and then aged at 200 °C. The results of the next series of experiments are reproduced in Fig. 2, where the change in (, μΩ·cm) is plotted against the quenching temperature ($T_{закл}$, °C), curves 1 and 2 relating, respectively, to annealed specimens and specimens ordered by the special treatment described above. Since it has been

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postulated that the ascendance of the $\rho = f(T_{\ })$ curve above 200 °C is associated with the presence of quenched-in vacancies, the increase in ρ due to this factor was determined. This necessitated determination of the energy of formation of the vacancies H_f, whose value of 17.4 kcal/mole was calculated from the slope of the $\ln(v_o) = f(1/T_{\ })$ curve, where v_o is the rate of change in ρ. The results are plotted in Fig. 2, where curve 3 represents the increase in ρ due to the presence of quenched-in vacancies. The results of the resistivity measurements were confirmed by the results of density determination. Some of these are reproduced in Fig. 4, where the relative change in density ($\Delta d/d_o$, lefthand scale, curve 1) and the increase in the lattice parameter ($\Delta a \times 10^6$ A, righthand scale, curve 3) are plotted against $T_{\ }$ (°C); curve 2 represents the change in density of the alloy due to formation of quenched-in vacancies. The general conclusion

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reached was that several phenomena may occur in Cu-Al solid solutions at high temperatures; order-disorder transformations, changes in the concentration of vacancies, migration of Al atoms from the interior of the grains to the grain boundaries in specimens quenched from high temperatures, and processes associated with the variation in the solid-solubility limit. The latter factor does not operate in Cu - 15 at.% Al alloys and if the high quenching temperature is excluded it can be stated that the main causes of changes observed in the alloy studied at high temperatures are order-disorder transformation, the part played by excess vacancies being negligible. There are 4 figures.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy nauchno-issledovatel'skiy institut (Siberian Physico-technical Scientific Research Institute)

SUBMITTED: November 4, 1961

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S/126/62/014/004/005/017
E132/E160

AUTHORS: Fadin, V.P., and Panin, V.Ye.

TITLE: Theory of the kinetics of ordering in solid solutions of Cu and Al

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.4, 1962, 517-522

TEXT: On the basis of the theory of I,N. Kidin and M.A. Shtremel' (Fiz. met. i metalloved., v.11, no.5, 1961) theoretical isotherms of the kinetics of ordering during annealing of quenched solid solutions of Cu and Al are derived. Theoretical and experimental isotherms are compared and agree satisfactorily for low quenching temperatures, but there are sharp divergences for high quenching temperatures. The alloy used for testing the theory was Cu with 14% Al, vacuum melted. It was quenched from 320 and from 600 °C, at which temperatures the degrees of disorder are substantially the same, but the ordering processes subsequently differ because of the different concentrations of quenched-in vacancies. The short-range ordering

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parameter

$$\sigma = \frac{p_{AB} - c_B}{p_{AB\ max} - c_B} \qquad (1)$$

where: c_B is the concentration of Cu and p_{AB} is the probability that a given bond of an Al atom will be joined to a Cu atom.

Isotherms were measured at 130, 180 and 200 °C. Experimental details of the X-ray measurements are not given but it appears that measurements of resistivity were also made. It is concluded that in the alloy as quenched from 600 °C there exist long range imperfections in the ordering.

There are 3 figures and 1 table.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskiy institut
(Siberian Physico-technical Institute)

SUBMITTED: April 13, 1962

FADIN, V.P.; RYABYSHKINA, G.A.

Effect of short-range order on the electric resistance of α-brass. Izv. vys. ucheb. zav.; fiz. no.5:75-79 '64.

(MIRA 17:11)

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